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AND

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A FLIGHT OF LOCUSTS.

By SIR EDWIN ARNOLD in the *Daily Telegram*, London.

We were sitting on a hill upon the southern side of the great plain of Esdraelon, in the Holy Land, with our backs turned to the west wind, which was softly blowing from the Mediterranean. The horses were picketed close by, grazing the sweet mountain grass. The Arabs of our caravans were cooking a "pillaw" a little distance off. Around us were laid out the wherewithals of a light lunch, among which was an open marmalade jar. I was thinking of Ahab, and wondering how he could put up so long with Elijah, especially when on this very spot the prophet said to the king, "As the Lord liveth, in this place where dogs licked the blood of Naboth shall dogs lick thy blood—even thine"—when suddenly, right into the marmalade, there dropped what I took for a large grasshopper. It was yellow and green, with long jumping legs and a big head, and while I was taking it out of the jar two others fell into a plate of soup and half a dozen more of the same kind upon a dish of salad. At the same time my horse stamped violently, and I saw more of these grasshop-

pers pelting his hocks and haunch. Turning round to find whence this insect shower came, I witnessed what was to me an extraordinary spectacle, though common enough of course in the East. A large cloud, denser in its lower than in its upper part, filled an eighth part of the western hemicycle. The remoter portion of it was as thick, as brown and brumous, as a London fog. The nearer side opened suddenly up into millions, and billions, and trillions, and sextillions of the same green and yellow insects, pelting in a close winged crowd quite as thickly as flakes of snow upon all the hillsides near and far. You could not stand a moment against the aggressive and offensive rain of these buzzing creatures. The horses even swung themselves round and stood with lowered crests, taking the storm upon their backs and flanks. You had to turn up the collar of your coat to keep them out of your neck, and button the front not to have your pockets filled with the repulsive swarm, which in two minutes had so peppered the whole scene round about that its color and character were entirely altered. Every little creature of the interminable flight on alighting veered himself round head to wind on the earth, just as if he had dropped anchor and swung to the breeze; and it was curious to notice that the general tint on the ground of their countless bodies was brown if you looked to windward, and green if you gazed to leeward. But very quickly the only green to be seen round about was the hue afforded by this sudden invasion. Even while we prepared to yield up the spot to them and pack our lunch baskets for departure they had cleared off grass and leaves and every verdant thing around: and where they rose again from the soil, or from any clump of trees in a hungry throng, the place they quitted had already assumed a barren and wintry aspect. The Syrian peasants passing along the roads were beating their breasts and cursing the ill-fortune of this plague. Some of them, none the less, gathered up a clothful of the noxious things; for the locust is distinctly edible. Half in wrath and revenge and half for a novelty in diet, the Arabs to this day eat a few of them, roasting them in wire nets or in earthern vessels over a slow fire till the wings and legs drop off, and the locust becomes crisp, in which state it tastes, as I am able to say from personal experiment, something like an unsalted prawn. But it seemed as if, had all Syria and the globe itself taken to living on locusts, they would hardly have made a sensi-

ble mark upon the extraordinary number that drifted that day over our heads. St. John the Baptist is said to have supported existence upon that sort of "locust" which grows on the carob tree, a kind of sweet bean; but this is very probably a mistake of the commentators, who did not wish history to feed so distinguished a character upon a diet so disgusting. Probably he, too, ate dried grasshoppers, for there is no doubt whatever that Easterners have already retaliated upon these devourers of their crops by in turn devouring them. No better proof is wanted of this than the constant practice of the Arabs to-day, and that verse in Leviticus which runs, "Thou mayest eat the locust after his kind, the bald locust after his kind, the beetle after his kind, and the grasshopper after his kind."

The flying plague passed away almost as quickly as it had come, disappearing over Jezreel and the Jordan in the same long, low brown cloud. But the earth remained for a long time strewn with them, almost as closely as if none had taken wing. Every depression in the ground, every horse-hoof mark, was filled with dozens or scores of them, spitting a green juice and always head to wind; and what we observed was nothing—be it remembered—compared to the flights witnessed in southern Africa and elsewhere. Borrow, in his travels, speaks of the ground being covered by them over an area of 2000 square miles. Travelers tell of wide rivers, the water of which becomes invisible on account of the dead bodies of these insects floating on the surface. The Albert Nyanza is called by the natives the "Muta Nzigi," or "lake of the white locusts," from the enormous masses of these creatures which drown in its waves and are washed up on its shores in pestiferous heaps. That is the worst of the locust. In inhabited countries it is almost more dreadful dead than alive—poisoning the cattle and spreading disease. It must be, however, an excellent manure in desolate regions, and no doubt, in some wonderful way of nature, manages to expiate its ravages by its agricultural usefulness. In Cyprus the English government has waged a long and costly war with this *Gryllus migratorius*, but if anybody had sat with us at lunch that day upon the hill in Esdraelon, it seems to me he would have backed the locusts against the strongest and richest government that ever went to war with its winged host.

CLASSIFICATION OF THE LEPIDOPTERA.

By J. B. SMITH, New Brunswick, N. J.

In the September, 1894, number of the ENT. NEWS, Mr. Tutt makes some suggestions on Classification, particularly in reference to the Pterophoridæ and Alucitidæ. Concerning these families, or whatever else their rank may be, I will venture no opinion; but on the general subject of which Mr. Tutt speaks I believe I am entitled to an opinion, and this, while I do not disagree with Mr. Tutt, is not quite entirely in accord with his suggestions. For instance, I do not believe for a moment that "There never will be a final authoritative revision of any genus of butterflies until the preparatory stages in every species of it is known," and in the same way I do not believe that it is necessary to know all the early stages before making a final classification of Lepidoptera, based upon characters of the adult only. I would not for a moment suggest the idea that the early stages are not of importance. On the contrary I believe that they are of the highest possible importance, and I believe that no classification which associates forms which show any real divergence in the structure of any of the early stages can be final. But this proves only the imperfection of the classification, and not that a perfect classification is not possible. I wish to say again, as I have said so frequently, that I do not believe that the present basis for our classification is a correct one. Many of the characters in use are valuable and absolute so far as they go, but we must remember that the entire external skeleton of the Lepidoptera has received practically no consideration in classification. We must remember that this very external skeleton affords characters of the very highest importance in the Coleoptera and Hymenoptera as well as in other orders, and we must remember that in those orders the classification as based upon the structure of the adults carries throughout the entire life-history, and in so far as it does, the classification may be considered final. In other words, I believe that there can be no essential variation in the structure or history of any of the early stages, which does not also leave its mark upon the imago, or final stage, and that when we really know the Lepidoptera as we know some of the other orders, notably the Coleoptera, our classification based upon the imagos will be found to agree perfectly with any reasonable clas-

sification based upon the early stages. The preparatory stages in the Lepidoptera are merely steps to a final end, the imago. It is the imago that represents the species, and that in itself is the product of all the circumstances that have surrounded the species in all its stages beginning with the egg. It is perfectly logical to consider that in the imago itself we have the perfect species, and that the early stages are really only preparatory, and this is especially true if we accept Dr. Gill's suggestion that the larval stages in the Lepidoptera are simply interpolated. Larval characters may help us, and undoubtedly will help us by giving suggestions as to erroneous associations, but whenever this occurs we will find on a careful study of the adults that we have overlooked some characteristic, or failed to appreciate the importance of some point which will eventually enable us to make proper associates. I think it may be taken for granted that no two real species of animals, including the insects under that very general term, are ever entirely alike, and the whole matter is simply a question of our ability to ascertain the points of differentiation. Larval characters are just as apt to be mistaken or misinterpreted as those of the imago, and this holds true, as well, of characters drawn from the pupa, or from any other stage preceding the imago. There are at the present day, I believe, very few naturalists that have not had some field experience; that have not observed insects in the field as well as in the cabinet; and that are not familiar, at least in a general way, with the characters of the larvæ, and I do not believe that there are many who do not realize that family differences, and to a less extent specific differences, are marked throughout the entire life of the insect. Yet, to repeat again what has been already said, the culmination is always in the sexually mature insect, and it is in this (using the singular term to include the two sexes) that we must look for the sum of all the characters, which will enable us to place the creature where it belongs in a natural classification.

Miss Oldun (listening to the insects hum)—"I should so love to be a locust." He (inadvertently)—"You couldn't very well be one of the seventeen-year variety."—*Newspaper.*

DATA ON THE DISTRIBUTION OF DRAGONFLIES (ODONATA)—I.

By PHILIP P. CALVERT, Philadelphia.

During the past seven years I have received dragonflies from various localities and entomologists. Since these collections in many instances add to our knowledge of the distribution of species beyond that hitherto published, I have determined to print lists of these collections, except in those cases in which I know the collectors intend doing so under their own names. An asterisk (*) denotes that the species, before whose name it is placed, has not hitherto been recorded from that State, although in some such instances I have already cited the locality in my Catalogue of Philadelphia Odonata (Trans. Am. Ent. Soc. xx, pp. 227–266, 1893).

MAINE.

Lists of Odonata from different localities have been published in the NEWS by Miss Wadsworth (vol. i, pp. 36, 55; vol ii, p. 11; vol. iii, p. 8; vol. v, p. 132), Prof. Harvey (vol. ii, pp. 50, 73; vol. iii, pp. 91, 116) and Mr. Bullock (vol. ii, p. 93).

In 1891, Mr. Bullock also gathered a few specimens at Mt. Desert Island, as follows:

Calopteryx maculata Beauv. July 13th.
Argia violacea Hagen. July 13th.
Enallagma hageni Walsh. July 13th, very numerous.
Gomphus exilis Selys. July 13th.
Leucorhinia frigida Hagen. One male, July 10; "eyes chestnut-brown above, greenish in centre, greenish yellow below; apparently just emerged."

A collection made by Mr. J. P. Moore, at York Harbor in 1890, comprised the following species:

Lestes unguiculata Hagen. August 12, 15.
Nehalennia irene Hag. August 15.
Enallagma civile Hag. July 30, Aug. 15.
Ischnura verticalis Say. July 29–Aug. 14.
Diplax rubicundula Say. Aug. 12, 15.
D. obtrusa Hag. Aug. 15.
D. vicina Hag. Aug. 12.
D. costifera Uhler. Aug. 1 (one teneral ♂).

NEW HAMPSHIRE.

Mrs. Slosson has made collections in the White Mountains, and we may expect a list of these from her pen. As a contribution to such a future summary, the following observations may be recorded.

At ponds near the White Mountain House (near Fabyan's) I took, in 1889,—

* *Lestes disjuncta* Selys. Aug. 22.
* *Enallagma ebrium* Hag. Aug. 23.
Ischnura verticalis Say. Aug. 22.
Aeschna constricta Say. Aug. 22
" *clepsydra* Say. Aug. 22. Two males (see the NEWS, vol. v, p. 11).
Somatochlora elongata Scud. Aug. 21, one female ovipositing.
Diplax rubicundula Say. Aug. 22.
* " *obtrusa* Hag. Aug. 22.
* " *vicina* Hag. Aug. 22.

In 1890 I obtained:

* *Lestes uncata* Kirby. North Conway, July 31.
* *Enallagma aspersum* Hag. Echo Lake (near N. Conway), July 31.
Aeschna constricta Say. Hermit Lake (on Mt. Washington), Aug. 2.
" *clepsydra* Say. Hermit Lake, Aug. 2 (*eremita* Scud.).
Cordulia shurtleffi Scud. Hermit Lake, Aug. 2, two ♂.
Somatochlora albicincta Burm. Hermit Lake, Aug. 2, one ♂ one ♀.
" *elongata* Scud. Hermit Lake, Aug. 2, one ♂.
* " *tenebrosa* Say. Moat Mountain (near North Conway), Aug. 1, one ♂.
Diplax rubicundula Say. Hermit Lake, Aug. 2, and North Conway, July 31.

VERMONT.

Very few species have been recorded from this State. Mrs. Slosson sent me the following four species from Newport, on Lake Memphremagog, taken in the latter part of June, 1893:

* *Calopteryx maculata* Beauv. * *Ischnura verticalis* Say.
* " *æquabilis* Say. * *Gomphæschna furcillata* Say.

MASSACHUSETTS.

Mr. E. F. Hitchings has published a list of forty species, taken at Lake Quinsigamond, Worcester, in the NEWS, vol. iii, p. 39. Mr. A. L. Babcock has been collecting at Sherborn, Middlesex County, and will perhaps furnish a complete list.

During the past Summer (1894) I noted the following species at Wood's Holl, but the observations have not the slightest pretension to being exhaustive:

* *Enallagma durum* Hag. July 9, 19.
" *civile* Hag. July 5, 9, 19 (ovipositing), Aug. 8.
" *aspersum* Hag. July 9.
Ischnura verticalis Say. July 5–Aug. 8.
Anax junius Dru. Aug. 8.
* *Libellula auripennis* Burm. July 19 (ovipositing), Aug. 8.
" *semifasciata* Burm. July 9.
" *pulchella* Dru. July 9, 19, Aug. 8.
Plathemis trimaculata Dru. July 9, 19, Aug. 8.
Micrathyria berenice Dru. July 5, 9, 19 (ovipositing, ♂ clasping ♀), Aug. 8 (do.).
Celithemis elisa Hag. July 19 (ovipositing, ♂ clasping ♀).
Diplax rubicundula Say. July 9, 29, Aug. 8.
Mesothemis simplicicollis Say. July 19.

The Elizabeth Islands are a small chain stretching in a southwesterly direction from the mainland at Wood's Holl. The chief members of the group, from the mainland southwestwards, are Nonemeset, Uncatena, Naushon, Pasque, Nashawena and Cuttyhunk. On August 10, 1894, I took the following species at fresh water ponds on Nonemeset:

Enallagma civile Hag. * *E. doubledayi* Selys. *E. aspersum* Hag.

And on July 17, 1894, at fresh water ponds on Cuttyhunk, I found:

Lestes unguiculata Hag.
" *forcipata* Ramb.
* *Enallagma durum* Hag.
" *civile* Hag.
Ischnura verticalis Say.
Anax junius Dru.
Tramea sp. (*carolina* L.?)
* *Libellula auripennis* Burm.
" *pulchella* Dru.
Diplax rubicundula Say.
Mesothemis simplicicollis Say.

Of these records, the most interesting is undoubtedly that of *Enallagma doubledayi* from Nonemeset, as this species has hitherto been known from Florida only. The six males which I secured agree completely with Floridan specimens.

It was not my good fortune to find *Anax longipes* Hag. which Dr. Hagen took at Wood's Holl Aug. 26 and 27, 1875 (see "Ent. Mo. Mag." xx, p. 169, 1884), although I was on the lookout for it.

HINTS IN REGARD TO MOUNTING HYMENOPTERA AND DIPTERA.

By W. A. Nason, Algonquin, Ill.

Dr. Henri De Saussure, in his "Synopsis of Solitary Wasps," published by the Smithsonian Institution, on page xix, makes some interesting suggestions in regard to the preparations of these insects for study. To observe to best advantage the characters most useful in classification, they should, as he says, have their wings drooped forward, leaving thus the meso- and metathorax exposed, and in addition have the abdomen bent well downward.

The usefulness of some such system of preparation of most Hymenoptera and Diptera has been impressed very strongly on my attention recently. Groups differ much in the class of characters most needed for study of the dorsal surface of the insects above mentioned, but in nearly all the meso- and metathorax and dorsal segments of abdomen, offer more or less characters of importance. Many of the species of Diptera and Hymenoptera fold their wings over the abdomen closely when killed. This obscures the characters that should be most clearly exposed, when assignment to families and genera is attempted. It also makes the study of the venation, so important in these groups troublesome, and often necessitates the softening process, and possible mutilation of the specimen necessary.

All this trouble the writer has found by experience to be easily avoided by a few slight manœuvres during the process of pinning. It is my custom to pin with the insect held between forefinger and thumb of left hand, and while the insect is still within the grasp of the fingers, after the pin has transfixed the thorax, I push up the wings to an angle of 45°, more or less, thus exposing the scutellum and dorsal surface of abdomen. It also leaves the wings in good position, for examination with the lens, to determine their venation.

Where the above-mentioned plan fails to quickly accomplish the desired position of wings I adopt another manœuvre. While the bee, fly, or other insect is still in process of mounting, I hold the insect an inch or two from my mouth, with the transfixing pin at an angle of about 45°, with the vent of the insect toward my mouth, and then blow the insect with greater or less force in

accord with its strength or delicacy. This operation very seldom fails of placing both fore and hind wings of Hymenoptera in a desirable position for study of venation, and never fails with Diptera.

The two simple manœuvres mentioned above have in my hands seldom failed to yield most satisfactory results, and their practical utility cannot be overestimated, for they consume no appreciable time, nor do any injury to the most delicate insects, only excepting the loss of legs of Tipulidæ. But these manipulations of course require a certain amount of practice and judgment in the operator, to avoid using too harsh force with the fingers or breath.

The importance of this preparatory treatment of many Diptera and Hymenoptera, and especially of the Tenthredinidæ cannot but be evident to all entomologists who examine the material of numerous collectors, or who make wide exchanges. And this fact must be the excuse for my offering these suggestions to collectors, especially as I have never seen the ideas forcibly expressed, except by Dr. H. D. Saussure as mentioned, or else in some scheme for an elaborate "setting" of these insects, which latter plan I think objectionable for many reasons. There is room also for suggestion in regard to drooping more or less the legs of these insects, and other little manipulations which enhance the value for study of specimens, of which I will not speak at present. But I hope these suggestions may be heeded by collectors, for many would find that such a course would enhance the desirability of their specimens, and would also greatly improve the *tout ensemble* of their collections.

———o———

NEW LOCALITIES FOR HYMENOPTERA.

By W. A. Nason, Algonquin, Ill.

I have to record the capture at Algonquin, Ill., during the past season of *Podium rufipes*, *Sphex* (*Harpactopus*) *abdominalis*, *Nortonia symmorpha*.

P. rufipes was taken on a board fence bordering some wood land. Its flat body was noticeable as it crouched closely down to the edge of the board on which it was resting.

S. abdominalis was taken on *Melilotus alba*, which has become an abundant and troublesome weed in this section.

N. symmorpha was taken with other solitary wasps while using the beating net.

As the first two mentioned are southern species, the capture of them in this locality, fifty miles northwest of Chicago, is thought worthy of record. The *Nortonia* is always rare, and its capture, therefore, noticeable. I have taken a large number of species, recorded in Cresson's catalogue as from Texas, in this locality, and think the fact of some value in its relation to the geographical distribution of the North American Hymenoptera.

The white sweet clover, *Melilotus alba*, has become very troublesome since its introduction in this section, crowding the highways and overpowering the *Solidagos*, *Asters*, and other prairie weeds. But the Hymenoptera take kindly to it, and I have found it, in Summer and Autumn, a splendid collecting ground. On it I have taken many of the larger Scolidæ, Larridæ, Pompilidæ, Sphecidæ, Vespidæ, Crabronidæ, Philanthidæ, Andrenidæ and Apidæ very abundantly, as well as numbers of specimens of all families. It is also an excellent collecting ground for Tachinidæ, Syrphidæ, Stratiomyidæ and other families of Diptera. I never visit a patch of the plant in August, September or October, without finding a large variety of desirable species.*

A BOUQUET OF LOCAL ODOR FOR THE BREAKFAST TABLE.—The collection of beetles in the Academy of Natural Sciences, so useful in classifying and determining the identity of pests destructive to agriculture, numbers several specimens of the Hercules, the largest of American beetles. This variety has grown so scarce that a collector in this city paid a good price for one to a youth who found it on an up-town sidewalk a few days ago. It was perfectly preserved, and, including the immense horn, measured four inches in length. A fact not generally known about this variety is, that by noting that the larvæ possessed an odor resembling that of Russian leather, and that they fed on decayed ash timber, a Middletown (N. Y.) tanner succeeded in producing a leather claimed to be fully equal to the Russian and now largely used in the binding of books. —*Newspaper Entomology.*

LOCUSTS and dragonflies, the latter commonly called "devil's darning needles," have had a battle in the air at Perth Amboy, N. J., and such of the locusts as survived have only felt sew-sew ever since.—*Newspaper.*

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* I am indebted to Mr. Wm. J. Fox for the determination of the species mentioned.

ENTOMOLOGICAL NEWS.

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PHILADELPHIA, PA., OCTOBER, 1894.

THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

THE recent meeting in Brooklyn of this body calls up a number of thoughts in relation to the progress of entomology. We may start with the times when a man is said to have been burnt at the stake for witchcraft who had the faculty of converting caterpillars into butterflies. The next period may be considered to have been the time when it was considered an act of insanity to collect insects, as was related of Lady Glanville, some of whose relatives tried to set her will aside on such grounds. The time has only recently passed when the collector of insects was dubbed bug-hunter as a term of derision, and looked upon as a harmless kind of lunatic. The time has not yet come wherein the entomologist has found his true place in the respect of the community at large, but he is fully recognized by the vast majority of intelligent people, and his place among naturalists fully established. The meeting above mentioned proves the value of entomology from an economic standpoint and also shows Governmental and State recognition of the importance of this study from a pecuniary standpoint, and we are satisfied that this idea is one that must grow, as anything that appeals to man's pocket-book must be finally established on a firm basis. All this means that entomology, as a study, is receiving its just appreciation, and that economic entomology has a great future, and will undoubtedly be more and more recognized as a pursuit of great value to mankind. We did not have the pleasure of hearing the Presidential address at the meeting, but economic entomology, historically considered, is a subject of much interest, and the address could not have failed to have been one well worth hearing.

DEPARTMENT OF ECONOMIC ENTOMOLOGY.

Edited by Prof. JOHN B. SMITH, Sc. D., New Brunswick, N. J.

Meeting of the Association of Economic Entomologists.—The Sixth Annual Meeting of this Association was held at Brooklyn, N. Y., Aug. 14 and 15, 1894, and was an extremely profitable one to those who attended. The attendance was comparatively small, however, and only five States were represented. Even the local collectors were in small numbers, and altogether the attendance did not exceed twenty-five.

Mr. L. O. Howard presided, and opened the meeting by reading his Presidential address on "The Rise and Present Status of Official Economic Entomology." The paper was historical in character and traced the rise of Official Entomology from Mosaic times, finding also several scriptural descriptions of insect injury. Special attention was given to the development of the economic side of the science in our own country, and the peculiar conditions favoring this development were recorded. In some of the older European countries information concerning insects is so widespread and so general that no special officer is needed. However, in almost all parts of the world special investigations are now making and everywhere governments are appreciating the importance of such work. Up to the present time America is in advance in economic entomology, but it will require hard work, in the opinion of the reader, to maintain that position in the future.

The first paper of the session was read by John B. Smith, on "Some Experiments with Carbon bisulphide as an Insecticide." Mr. Smith recounted a series of experiments made to destroy melon lice, covering the hills with bowls and evaporating one dram of the bisulphide in a graduate or shallow dish. In all cases all living insects on the hills treated were destroyed, without injury, except where the material was poured on the ground close to the plant. He thinks this method of protecting melon fields practical, because the lice do not appear all over the fields at one time, but infest isolated hills or little groups of hills and spreads from these points. Destroying these centres of infection early in the season would mean practical exemption later on.

Mr. Southwick spoke of using bisulphide emulsified with "polyzol" as a wash for trees to kill plant-lice. Mr. Saunders suggested the use of "protection cloth" to cover the hills to be treated or of paper plant-covers, sold by seedsmen. Mr. Galloway explained an observed effect of the bisulphide in causing water globules to appear on the leaves as due to the rapid lowering of temperature caused by the bisulphide.

A paper on "Spraying without a Pump" was presented from Mr. J. M. Aldrich, and suggested that where water pressure is available a nozzle could be used into which a small jet of the insecticide could be led to be carried out and mixed in the spray caused by the water pressure.

"Notes on Insecticides" were presented by Mr. C. L. Marlatt. He spoke of a large number of experiments with various insecticides noting their effect. From his experience it seems that the kerosene emulsion may be used at a much greater strength than usually recommended. Mechanical mixtures of kerosene and water he had not found reliable, the two liquids not mixing continuously in the same proportions, making it impossible to apply them at a definite ratio. Arsenate of lead he considers meritorious, and the most promising of new insecticides.

Mr. B. T. Galloway followed on "Some new Insecticides and their combination with Fungicides." This paper dealt largely with mixtures of kerosene and emulsions, which, it is found, are easily made with lime. The ordinary emulsion with soap may be diluted with the Bordeaux mixture instead of with water. A variety of resin washes were described and combinations with kerosene were shown. It appears that our battery of insecticides is far from being exhausted, and that we have yet an enormous field for experimentation. No single mixture or wash was specifically recommended, but the subject was presented suggestively rather than otherwise. Considerable discussion ensued and many questions were asked concerning the effects of the mixtures on plants and insects.

A paper from Mr. F. M. Webster was on "Spraying with Arsenites *vs.* Bees," in which he relates the results of some experiments which seem to prove that bees and their brood may be killed by feeding in sprayed blossoms. This is the first piece of real evidence in the case, but is yet far from conclusive. The paper, when published, will be worthy of close analysis.

Mr. E. B. Southwick gave a description of the "Economic Entomological work in the parks of New York City." He gave in some detail the chief troubles of the entomologists and described the means used to lesson or destroy the insects. A feature of the work is the very large part played by manual labor—*i. e.*, the collecting and destroying as against spraying or the use of poisons. Another interesting item was the use of a forcible jet of clear water to break up colonies of plant-lice before using insecticides. This was favorably commented on by Mr. Howard.

Later on Mr. Southwick also presented a note on "The Wood Leopard Moth in the parks of New York City." This is *Zeuzera pyrina*, and it is the most difficult of all pests to deal with. It is beyond reach of poisons and only cutting and burning infested wood, or searching for and destroying larvæ in valuable trees seems to be effective. This seems to have lessened the numbers somewhat. Electric lights to attract the moths are a desideratum and may be obtained in the future. The larva seems to be migratory to some extent and often, in confinement, leaves one twig or branch for another.

Mr. Smith remarked that this latter character was shared by other Cossid larvæ, one of those boring in oak having been observed by him.

Mr. A. D. Hopkins gave "Notes on some discoveries and observations of the year in West Virginia." A very large number of insects were men

tioned and interesting observations noted. *Corthylus columbianus* working in Poplar, so far from being injurious, may be considered rather an advantage, since it gives rise to discolorations which add materially to the appearance of the wood. Some extremely striking and handsome examples were exhibited. Woodpeckers working in the bark of certain trees, reaching the Cambium layer but not injuring the wood, causes a deformation in the grain which is known as "curly," or "bird's-eye," and is sought for and valued. It has been found, that in West Virginia, scab in potatoes is often due to a small Sciarid, the male of which is wingless, and which sometimes destroys the entire tuber. No pretence is made that this is the source of all scab. *Agrilus bilineatus* attacks chestnut, and occasionally causes serious injury. *Phymatodes variabilis* attacks and seriously injures tan bank. A species of *Aphidius* was mentioned which, in the green-house, effectually rid the lettuce plants of plant-lice, and it was recommended to protect the creatures wherever they occurred. An attack of melon lice was noted where the Coccinellidæ were in great force attacking them.

Mr. Smith did not believe in the usefulness of parasites, as a general rule, and contended that they usually appear in force only after the damage is done. In the green-house, however, the circumstances may be sufficiently changed to make them more effective. He has seen hordes of Coccinellidæ and their larvæ devouring melon lice in an infested field; but they were at work on the rear guard, and the plants were killed before the beetles mastered the lice. *Phymatodes variabilis* in New Jersey was one of the "bark-slippers" as the woodmen term them. They work under bark of cord-wood cut and piled, and in such numbers that after a year or two the entire bark is loosened and slips off readily.

A paper from Mr. F. H. Snow was read, on "Work in Economic Entomology at the University of Kansas for the season of 1894." It was largely a record of a very interesting experiment in clearing a corn-field of Chinch-bugs, in which the details of the applications are fully given and the daily difference in appearance was noted. The experiment proved completely successful, and is the most fully recorded of any hitherto made on this subject.

Mr. L. O. Howard spoke on "Eastern occurrence of the San Jose Scale," giving a record of the facts as they were brought to the attention of the U. S. Department of Agriculture and the measures taken to exterminate the pest. It has appeared in Florida over a large extent of territory and probably introduced direct; in Virginia, North Carolina, Maryland, Pennsylvania, Indiana and New Jersey in most instances introduced from New Jersey nurseries. In all cases active measures are under way and resin washes, kerosene emulsion and even whale oil soap have been found successful when thoroughly applied.

Mr. John B. Smith followed on "the San Jose Scale in New Jersey," giving a history of its introduction into the State and the spread and distribution within it. A considerable number of infested orchards have been

found south of the red shale, and in all cases active measures are being taken to stamp out the pest. He has no doubt that these measures will be successful. He called attention to the fact that California pears in the city markets were infested by the Scale and exhibited six pears just purchased which contained male and female Scales in all stages of growth and some of them had living larvæ crawling over them. This, he claims, constitutes a distinct source of danger.

Mr. G. C. Davis presented "A few notes on Mealy Bugs and allies." The life-history of some of our well known forms was detailed at some length, and a new species was characterized, the points of difference between all our forms being pointed out and some of them illustrated.

A second paper, read by Mr. Davis, was on "Clover Insects," among which he recorded the appearance of the Clover-leaf beetle, *Phytonomous punctatus* in Michigan, and also the appearance of the fungous disease which swept them off before the larvæ reached maturity.

Mr. Marlatt described an occurence of "The Pear-tree Psylla in Maryland." The insect was introduced on nursery stock from New York and multiplied rapidly, at the present time infesting a large part of one of the largest pear orchards of Maryland. The history of the species was detailed so fas as observed, and its egg-laying habits described, as was the injury caused. The appearance of Chrysopa in the egg and larva state was observed, the latter preying upon the Psyllids. Kerosene emulison proved a successful remedy even against larvæ covered by honey dew; but the application, it is reccommended should be made soon after the plants leaf out. Winter washes are also advised.

Mr. Smith presented some "Notes of the Year" from New Jersey. The pear midge is steadily spreading in the State, and a new pest, the larva of an *Agrilus*, has made its appearance in Essex Co., and is killing many trees. Cut-worms have been extremely abundant in some localities and have been successfully fought by placing at the base of the plants poisoned bran, which was devoured by the larvæ in preference to the growing crop. The distribution of an injury caused by the Periodical Cicida was described and a map of the country covered was exhibited. Melon lice were abundant and injurious, the absence of a cold storm late in June or early in July giving them the opportunity to develop. Sweet potato growers are using chickens very largely to keep their vines clear of Cassidæ. The onion maggot again made its appearance in Cumberland County and was again checked by using Kainit and Nitrate of Soda. The potato-stalk borer, *Trichobaris trinotatus*, appeared in great numbers in certain localities, ninety per cent. of the vines being infested in some fields.

A paper from Mr. F. H. Chittenden, entitled "Late Notes on the Strawberry Weevil" was presented and contained a number of new observations and the results of a number of insecticide experiments. The insects were altogether less abundant than in 1893 and Paris green proved unexpectedly effective in preventing injury.

A number of other papers were read by title only and referred to a committee to consider their place in the printed minutes.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

[The Conductors of ENTOMOLOGICAL NEWS solicit, and will thankfully receive items of news, likely to interest its readers, from any source. The author's name will be given in each case for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for certain issue. Twenty-five "extras" without change in form will be given free when they are wanted, and this should be so stated on the MS. along with the number desired. The receipt of all papers will be acknowledged.—ED.

PICTURES for the album of the American Entomological Society have been received from D. S. Kellicott, J. B. Lembert and W. R. Reinicke.

WAS IT A LIGHTNING BUG?—It is reported from the Creek neighborhood that Miss Maggie Steel, while sewing one day last week, undertook to knock a small bug from the garment on which she was sewing when it caught on the end of her finger and burrowed into it, reaching almost the second joint before she succeeded in stopping it, which she did by pressing the needle against the finger and pushing the little insect backward. It made its way under the skin of the finger just as a mole goes under the surface of the ground, and she describes the sensation as very painful. No one knew what the insect was, and it seems to have been the first of its kind.—*Lancaster Ledger*, S. C.

THE FORMATION OF NEW GENERA in the animal kingdom does not at all require long periods. It can rather occur quite suddenly, from one generation to the other, as in an instance observed and communicated by the naturalist, Moritz Wagner.

In the year 1870 a Swiss collector brought a number of pupæ of the Texan butterfly, *Saturnia luna* (having the name from the lunulate spots on the four wings) to Switzerland. The butterflies which, in May, 1871, emerged from the cocoons which had remained during the Winter in Switzerland, were of the true Texan form. Some of these imagoes deposited several hundred of fecundated eggs.

The little larvæ appeared a few weeks later, and were already at their first shedding the skin of a much yellower color than those in Texas. They were fed in the house with leaves of an European plant belonging to the Texan species, and ate voraciously, pupated end of June, and the imagoes emerged in the first half of August. These imagoes were very different from the Texan form, not alone in color, but also in form and markings so much, that they would have been considered as an entirely different species if their pedigree had not been known. All the thirty-five

imagoes differed in their form and markings from the original forms. A trial to raise a third generation was without success; the larvæ contracted a disease and died. Other food and the change of climate had certainly caused those distinct new forms.—AUGUST MERKEL, New York.

HOW FAR DO THE BEES FLY?—Many authors have attempted to answer this question, but none have succeeded. Theoretically, the solution has been attempted by counting the number of wing beats per second, and from that to guess the distance the bees fly from their hives. The results have differed widely, varying from two to twelve English miles. According to Prof. Marcy's "graphic method," the bees make one hundred and ninety wing beats per second. His method consists in fastening a bee in such a way that its wings are free to move, one of them touching lightly a rotating cylinder covered with a smooth and lightly blackened paper. Prof. Landois, who has studied the sound apparatus of many animals, thinks, from the pitch of the sounds made by the vibrating wings, that they move to and fro at the rate of four hundred vibrations per second—more than double Marcy's results. According to Prof. Marcy's figures, one hundred and ninety wing beats per second would bring the bee over a distance of one English mile per minute. If Prof. Landois is right, the distance would be two miles. According to these estimates it would not be far from the truth to say that bees fly about thirty English miles an hour, or that, during an absence of twenty minutes from the hive, they fly about ten to twelve miles. Most observers, however, are inclined to think that the bees do not fly more than eighteen to twenty miles an hour, because the wing beats of a bee in freedom and under the observer's instrument are not the same. Every one has observed the comparatively slow flight of the bee, when returning home, loaded with honey and pollen. Practical examination shows that experiments of this kind are not entirely reliable. Better results are obtained by observing bees in districts where bees never before were found, or by introducing yellow bees where only gray or brown ones are known, or *vice versa*. In such cases it has been seen that the bees never went more than four to five English miles away at the utmost. The usual distance was two miles. One instance is known where a bee keeper on an island seven miles from the coast of Texas found that his bees went to the mainland for honey and pollen. A practical bee keeper does not expect any great results from flower fields three miles away. They should be no more than two miles away in a straight line.—*Folkebladet.*

THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.—The Sixth Annual Meeting of the Association of Economic Entomologists was held in room 12 of the Packer Institute, Brooklyn, N. Y., Aug. 14 and 15, 1894. The following officers and members were present: President, L. O. Howard, Washington, D. C.; Vice-President, J. B. Smith, New Brunswick, N. J.; Acting Secretary, C. L. Marlatt, Washington, D. C. Messrs. William H. Ashmead, Washington, D. C.; Geo. F. Atkinson, Ithaca, N. Y.; Nathan

Banks, Sea Cliff, N. Y.; D. W. Coquillett, Washington, D. C.; Geo. C. Davis, Agricultural College, Michigan; A. D. Hopkins, Morgantown, W. Va.; Geo. H. Hudson, Plattsburg, N. Y.; J. A. Lintner, Albany, N. Y.; V. H. Lowe, Jamaica, N. Y.; F. W. Raine, Morgantown, W. Va.; William Saunders, Ottawa, Canada; E. B. Southwick, Central Park, New York City; F. A. Sirrine, Jamaica, N. Y. There were also in attendance upon the meetings visitors and members of other scientific societies, the average attendance being twenty-five persons.

The following active members were elected: F. C. Test, C. E. Chambliss and H. G. Hubbard, all of the Department of Agriculture, Washington, D. C.; Victor H. Lowe and F. A. Sirrine, of Jamaica, N. Y.; and F. W. Raine, of Morgantown, W. Va.

The following persons were elected to foreign membership: Walter W. Froggatt, Technological Museum, Sydney, N. S. W.; Charles Whitehead, Barming House, Maidstone, Kent, England; Geo. H. Carpenter, Science and Art Museum, Dublin, Ireland; Dr. Geza Horvath, Ministry of Agriculture, Buda Pesth, Austria; Prof. A. Targioni-Tozzetti, R. Staz. d. Entom. Agric., Firenze, Italy; Prof. A. Giard, 14 Rue Stanislas, Paris, France; M. J. Danysz, Laboratoire de Parasitologie, Bourse de Commerce, Paris, France; Dr. J. Ritzema Bos, Wageningen, Netherlands; Mr. Sven Lampa, Entomologist, Dept. Agric., Stockholm, Sweden; Dr. N. Cholodkowsky, Institute Forestier, St. Petersburg, Russia; Dr. K. Lindemann, Landwirthschaftliche Akademie, Moscow, Russia; Prof. A. Portschinsky, Bur. Entom., Ministere de l'Agriculture, St. Petersburg, Russia; Mr. E. C. Reed, Baños de los Cauquenos, Chile.

The following officers were elected for the ensuing year: President, J. B. Smith, New Brunswick, N. J.; Vice-President, C. H. Fernald, Amherst, Mass.; Secretary, C. L. Marlett, Department of Agriculture, Washington, D. C.—C. L. MARLATT, *Acting Secretary*.

Identification of Insects (Imagos) for Subscribers.

Specimens will be named under the following conditions: 1st, The number of species to be **limited to twenty-five** for each sending; 2d, The sender to pay all expenses of transportation and the insects to becôme the property of the American Entomological Society; 3d, Each specimen must have a number attached so that the identification may be announced accordingly. Exotic species named only by special arrangement with the Editor, who should be consulted before specimens are sent. Send a 2 cent stamp with all insects for return of names. Before sending insects for identification, read page 41, Vol. III, Address all packages to ENTOMOLOGICAL NEWS, Academy Natural Sciences, Logan Square, Philadelphia, Pa.

Entomological Literature.

1. VERHANDLUNGEN DES NATURFORSCHENDEN VEREINES IN BRUNN vol. xxxi. Synoptic table of the Leucanidæ and Coprophagous Lamellicorns of the Palearctic Region, Edmund Reitter; pt. 5.

2. THE AMERICAN JOURNAL OF SCIENCE. New Haven, Conn., August, 1894.—Development of the lungs of spiders, O. L. Simmons (also published in Tuft's College Studies No. ii, and in Ann. Mag. N. H. September, 1894).—September, 1894. Effect of glaciation and of the glacial period on the present fauna of North America, S. H. Scudder.

3. CANADIAN ENTOMOLOGIST, August, 1894.—Canadian Hymenoptera, No. 5, W. Hague Harrington. An omitted Phycitid, A. R. Grote. Description of a new species of *Dorycephalus* (*D. platyrhynchus*), Herbert Osborn. Some Indiana Acrididæ.—iii, W. S. Blatchley. A leaf-tissue gall on the Mountain Cottonwood, C. H. Tyler Townsend. On some North American species of *Chionobas*, Dr. Herman Strecker. Notes on some of the Noctuæ in the British Museum Collection, J. W. Tutt. Coleoptera of Canada, H. F. Wickham. New Cynipidæ, C. P. Gillette. *Lithophane oriunda*, T. E. Bean. Is *Cœnonympha typhon* synonymous with *C. inornata*? F. I. Buckell. Glass tubes as incubators, J. B. Lembert. Assembling of *Attacus promethea*, J. Alston Moffat.—September, 1894. Some Indiana Acrididæ—iii, W. S. Blatchley. Canadian Hymenoptera, No. 6, W. H. Harrington. Coleoptera taken at Lake Worth, Florida, J. Hamilton, M.D. Life-history of *Papilio zolicaon*, A. M. Jordan. The Coleoptera of Canada, H. F. Wickham, figs.

4. ANALES DEL MUSEO NACIONAL DE MONTEVIDEO i, pp. 13–27.—Descriptions of some Hemiptera-Heteroptera, new or little known, C. Berg.

5. BRITISH NATURALIST, new series, No. 7. London, July 15, 1894.—Distinctions of insects, C. W. Dale.—No. 8, Aug. 15, 1894. The Hessian fly in South Devon, F. V. Theobald.

6. OTTAWA NATURALIST.—Report of the entomological branch 1893, and entomological notes, W. H. H.

7. BERICHT DES NATURWISSENSCHAFTLICHEN VEREINS FUR SCHWABEN UND NEUBURG, No. 31.—The Dragonflies or Odonata occurring in the Province of Schwaben and Neuburg, A. Wiedemann.

8. ANNALS AND MAGAZINE OF NATURAL HISTORY, vol. xiv, No. 80. London, August, 1894.—Descriptions of new species of Rhopalocera from Mexico and Central America, F. D. Godman and O. Salvin. A visit to Damma Island, East Indian Archipelago, James Walker. Notes on a small collection of Odonata, etc., from Upper Burma, ... W. F. Kirby. Descriptions of some new Coleoptera from Costa Rica, C. J. Gahan. Notes on the Thelyphonidæ contained in the collection of the British Museum, R. I. Pocock. New species of Geometers and Pyrales from the Khasia Hills, C. Swinhoe. Vestigial stigmata in the Arachnida, H. M. Bernard.—No. 81, September, 1894. New species of Histeridæ, G. Lewis. Description of a new species of Dragonfly (*Dythemis broadwayi*) from Trinidad, W. F. Kirby.

9. POPULAR SCIENCE MONTHLY, September, 1894.—Parasitic and predaceous insects, C. V. Riley.

10. MITTHEILUNGEN DES NATURWISSENSCHAFTLICHEN VEREINES FUR STEIERMARK, 1893. The Diptera of Steiermark—ii, P. G. Strobl.

11. PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, vol. xxx, pp. 17–113.—The North American Ceuthophili, Samuel H. Scudder. Vol. xxix, Biographical notice of Hermann August Hagen (with portrait), S. Henshaw.

12. MITTHEILUNGEN AUS DEM NATURHISTORISCHEN MUSEUM IN HAMBURG, Jhg. xi.—Revision of the scorpions, ii. Scorpionidæ and Bothriuridæ, Dr. Kraepelin.

13. VICTORIAN NATURALIST, xi, 3.—A catalogue of Victorian Heterocera, O. B. Lower.

14. THE JOURNAL OF THE LINNEAN SOCIETY, xxiv. London, No. 155, Aug. 26, 1893.—Contributions to our knowledge of the Arthropod fauna of the West Indies—Part I. Scorpiones and Pedipalpi, R. I. Pocock, 2 pls. (continued in Nos. 156, Chilopoda, and 157, Diplopoda and Malacopoda, 4 pls.)—No. 156, Nov. 23, 1893. Notes on the Chernetidæ, with special reference to the vestigial stigmata and to a new form of trachea, H. M. Bernard, 2 pls. No. 157, July 10, 1894 (see above).

15. ZEITSCHRIFT FUR WISSENSCHAFTLICHE ZOOLOGIE, lviii, 2. Leipsic, Aug. 7, 1894.—On spermatogenesis in the silk worm, E. Verson, 1 pl.

16. THE ENTOMOLOGIST'S RECORD. London, Aug. 15, 1894.—Notes on the variation of *Spilosoma mendica*, with some thoughts on the ancestral type of the genus, J. W. Tutt.

17. THE ENTOMOLOGIST'S MONTHLY MAGAZINE. London, August, 1894.—On mimicry in Diptera, C. J. Wainwright. Observations on Coccidæ—No. 8, R. Newstead.—September, 1894. Additions and corrections to the list of British Aculeate Hymenoptera, E. Saunders. A comparison of moth-grease solvents, H. G. Knaggs. Observations on the New Zealand glow-worm, *Bolitophila luminosa*, A. Norris. Observations on Coccidæ, No. 9, R. Newstead.

18. ANALES DEL MUSEO NACIONAL DE MONTEVIDEO, i, pp. 13–27, 1894.—Descriptions of some new and little-known Hemiptera-Heteroptera, Dr. C. Berg.

19. BIOLOGIA CENTRALI-AMERICANA. Pt. cxvii. London, July, 1894.—Arachnida-Araneidea, pp. 137–144, pl. xv, O. P. Cambridge. Coleoptera, vol. vi, pt. 2, pp. i–x, 237–249, pls. x–xiii, G. C. Champion; vol. vii, pp. 193–208, H. S. Gorham. Lepidoptera-Rhopalocera, vol. ii, pp. 353–360, F. D. Godman and O. Salvin. Rhynchota Homoptera, vol. ii, pp. 1–24, pl. i, W. W. Fowler. Orthoptera pp. 193–200, pl. x, H. de Saussure and L. Zehnter.

20. THE ENTOMOLOGIST. London, August, 1894.—Notes on the synonymy of Noctuid moths (cont.), A. G. Butler.—September, 1894. Ab-

normal example of *Zygæna trifolii*, R. South. fig. Life-history of *Vanessa c-album*, F. W. Frohawk. A catalogue of the Lepidoptera of Ireland (cont.), W. F. de V. Kane. Notes on the synonymy of Noctuid moths (cont.), A. G. Butler. On the Lepidopterous genus *Hexeris* of Grote, id.

21. MISCELLANEA ZOOLOGICA, ii, 3. Cette, Herault, France, March 1, 1894.—Descriptions of two *Anthicus* from North America, M. Pic.

22. NOTE IMENOTTEROLOGICHE. Nota ii. Nuovi generi e nueve specie di Imenotteri Antofili, G. Gribodo. Extr. Bull. Soc. Ent. Ital. xxv-xxvi, 1893-94.

23. LE NATURALISTE. Paris, Aug. 15, 1894.—Note on some new or little-known species of Asiatic Parnassines, L. Austaut (continued in number for September 1st).

24. COMPTE RENDU. L'ACADEMIE DES SCIENCES. Paris, Aug. 13, 1894.—On the heart of some Orthoptera, A. Kowalevski.—August 20. On the extraction of the free acids from beeswax, T. Marie.

25. THE JOURNAL OF PHYSIOLOGY, xvii, 1 and 2. London, Aug. 13, 1894.—Changes in ganglion cells from birth to senile death. Observations on man and honey bee, C. F. Hodge, 1 pl.

26. PROCEEDINGS OF ZOOLOGICAL SOCIETY OF LONDON, 1894, pt. ii, Aug. 1, 1894.—On the Hemiptera-Homoptera of the island of Grenada, West Indies, P. R. Uhler. On new species of Heterocera from tropical America, W. Schaus.

27. REVUE SCIENTIFIQUE. Paris, Aug. 18, 1894.—An invasion of Lepidoptera, L. Girod-Genet.

28. LE NATURALISTE CANADIEN. Chicoutimi, Quebec, August, 1894.—Course of popular entomology, G. Beaulieu, figs.

29. SCIENCE GOSSIP. London, September, 1894.—Larvæ-nymphs of some British Dragonflies (cont.), W. H. Nunney, figs.

30. BIOLOGISCHES CENTRALBLATT. Leipsic, Aug. 15, 1894.—On the morphology and embryology of a Tardigrade (*Macrobiotus macronyx*), R. v. Erlanger.

31. ZOOLOGISCHER ANZEIGER. Leipsic, Aug. 27, 1894.—On the question of the first stages of spermatogenesis in insects, Dr. N. Cholodkovsky.

32. PROCEEDINGS AND TRANSACTIONS OF THE ROYAL SOCIETY OF CANADA for 1893, xi. Ottawa, 1894.—Canadian Uroceridæ, W. Hague Harrington.

33. REVUE GENERALE DES SCIENCES. Paris, Aug. 30, 1894.—Parasitic castration and its biological consequences in animals and plants, C. Julin, figs.

34. REVUE DES SCIENCES NATURELLES APPLIQUEES. Paris, Sept. 5, 1894.—White worms, G. Rogeron.

35. THE AMERICAN NATURALIST. Philadelphia, September, 1894.—On the larvæ and pupæ of *Hololepta* and *Pyrochroa*, H. F. Wickham, 1 pl.

36. ESTUDIOS SOBRE LAS HORMIGAS DE COSTA RICA por Carlos Emery. Tipografia Nacional. San Jose, 1894 (Ministerio de Fomento). (Anales del Museo Nacional 1888–1889, pp. 45–67, 2 pls.)

37. THE GARDENERS' CHRONICLE. London, Sept. 8, 1894.—The currant bud-mite, R. Newstead.

38. PSYCHE. Cambridge, Mass., June–September, 1894. Published May 31, 1894. [Accidentally omitted from the September NEWS.]—On the pigeon mite, *Hypodectes filippi*, H. B. Ward. Notes on some Meloids, or blister beetles, of New Mexico and Arizona, C. H. T. Townsend. A preliminary list of the Acrididæ of New England, A. P. Morse. New and undescribed genera of West African Noctuidæ—v, W. J. Holland, 3 pls. A preliminary list of the butterflies of northeastern Mississippi, H. E. Weed. Notes on the rearing of *Platysamia cecropia*, K. W. Huston. Bibliographical notes—vi (Hemiptera-Heteroptera of Biol. Cent.-Amer.), S. Henshaw. Notes on Bombycid larvæ, H. G. Dyar.

Readers of the NEWS, as well as the associate editor, are indebted to Dr. Skinner and Mr. W. J. Fox for digesting the entomological literature arriving during my absence from Philadelphia in July and August.—P. P. C.

INDEX TO THE PRECEDING LITERATURE.

The number after each author's name in this index refers to the journal, as numbered in the preceding literature, in which that author's paper was published; * denotes new North American forms.

THE GENERAL SUBJECT.

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The Entomological Section

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

PROCEEDINGS OF MEETINGS.

The following papers were read and accepted by the Committee for publication in ENTOMOLOGICAL NEWS:

Descriptions of the Larvæ of Tritoma, Carpophilus and Cyllodes.

By H. F. WICKHAM, Iowa City, Iowa.

Tritoma humeralis Fabr. fig. 1.—Color of larva nearly white, head yellowish, the incisures of the body often dark from the introduction of earthy matter. Form moderately elongate, nearly cylindrical, but tapering to each end. Length 6-7 mm.

Head moderate in size, transversely subquadrate in outline, bristly, frontal margin produced between the mandibles and fringed on the outer edge; vertex with an impressed line each side extending from near the base to or near the origin of the antennæ. Antennæ very short, the first joint extremely thick and heavy, the second short and thick, but less so than the first, third more slender and bearing two articulations at tip. Eyes consist of six ocelli, situated immediately behind the antennæ. Mandibles nearly triangular, tip with two teeth, immediately inside of

these is a smaller tooth, while from this point to the base the edge is thinner and rather finely serrate. Maxillæ with the inner piece broad, truncate at tip, inner angle acute; along the free end is a number of pieces —about five; the outer piece is four-jointed, the three basal joints heavy, but rapidly decreasing in thickness, the fourth joint more slender and longer. Mentum short and broad, the palpi two-jointed, very thick, second joint longer and more slender than the first and armed at tip with a few small spines; ligula papilliform, furnished with two setæ. Prothorax transversely subelliptical, disc rugose, with a broad, shallow, transverse impression, bristly, posterior margin sinuate, sides rounded. Meso- and metathorax shorter. Abdomen of nine subequal segments, each with a double transverse row of bristles extending around the entire circumference. The ninth segment bears on the dorsal surface, between these rows, two short, erect, slightly recurved processes; there is also a tenth false segment, used as a prop-leg in walking. Spiracles dorso-lateral, in nine pairs of which the first is situated near the anterior mesothoracic angles, the remainder in much the same relation to segments one to eight of the abdomen; they are slightly exserted and brownish in color. Legs short, rather scantily bristled, the coxæ conical, trochanters distinct from and shorter than the femora, which are thicker near the tip, tibiæ again shorter and tapering to apex, claws simple and only moderately curved.

These larvæ were taken at Bayfield, Wis., about the middle of July. They lived in a fleshy fungus found growing on dead wood, and went under ground to pupate, remaining in this condition eight days. The pupa is 5 mm. in length, and most extremely bristly on the thorax, wing-pads and abdomen, the tip of the last bearing a stout spine.

Carpophilus niger Say, fig. 2.—Color of larva, in life, nearly white, head chestnut, in spirits the general color becomes yellowish. Form elongate, flattened, wider near the end of the abdomen. Length of alcoholic specimen 6 mm.

Head rather large, broader than long, narrower anteriorly, sides rounded, front with a long and broad prolongation between the antennæ, this lobe being rounded at tip. Labrum small, distinct, in the form of a triangle with the base excavated and the apex rounded. Antennæ four-jointed, the first joint extremely short and thick, the remainder successively more slender, the third joint longest. This joint also bears a small articulated appendage besides being the support of the fourth member; only a few short bristles can be seen. Mandibles nearly triangular in outline, the tip curved, the inner margin armed with about nine sharp teeth, of which the upper ones are longest and more curved. These teeth are again armed internally with spines forming a rather complicated structure. At the inner base of the mandible is seen an elliptical area which is distinctly transversely punctate-striate. Maxillæ with the outer lobe armed at tip with an extremely bristly scutiform subtriangular piece, immediately pre-

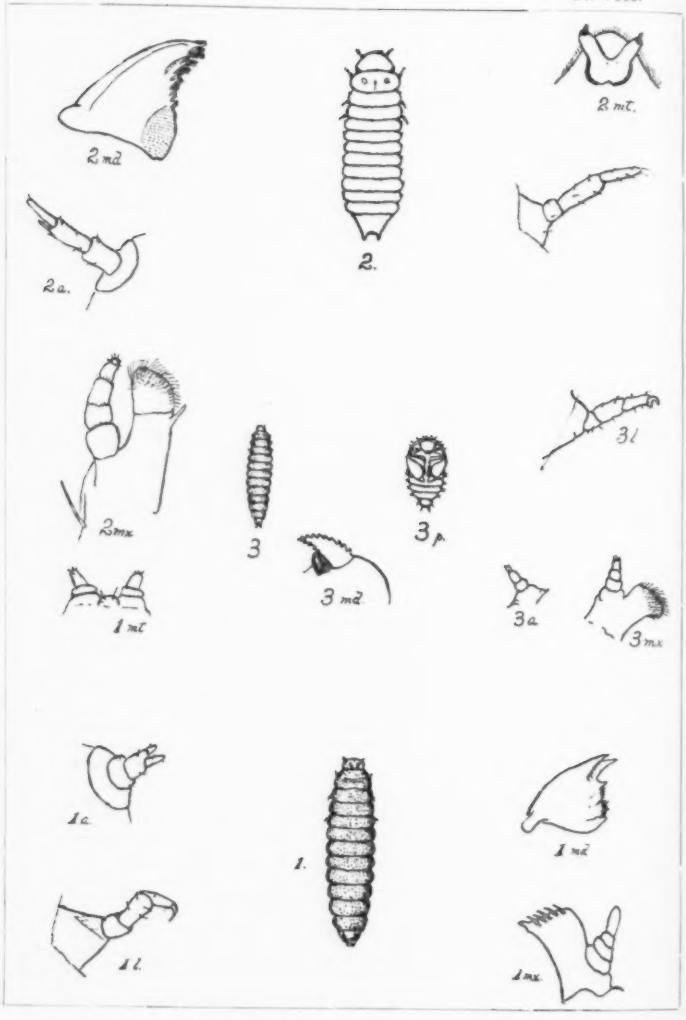
ceded by a rather long and slender process externally. The inner lobe is four-jointed and very heavy in proportion to the rest of the maxilla, the joints being very shortly bristled at their tips. The mentum presents the form shown in the figure, the palpi are stout, with a very minute terminal joint. Prothorax transversely elliptical, front margin slightly reflexed and thickened, disc with a median impression more distinct at base, on each side of which is situated a rather large shallow fovea. Meso- and metathorax shorter, less corneous. Abdomen of nine segments, the terminal one bearing at tip two conical pointed processes directed backwards, at the base of these are several small bristle-bearing tubercles; anus tuberculate. Spiracles prominent, exserted, in nine pairs of which the first is near the hind angles of the mesothorax, the remainder in segments one to eight of the abdomen. Legs rather short, coxæ nearly conical, trochanters distinct, claws simple. There are only a few bristles on each joint.

These larvæ were taken under bark at Bayfield, Wis., on the third of July. They went under ground to change to the pupa, each making a small cell by squirming, after the manner of Carabid larvæ. The pupa is 4 mm. in length, and except for being much flatter, is not unlike that of *Cyllodes biplagiatus* in form. The posterior legs are entirely covered by the wing pads, the prothorax has strong bristles on the dorsal region and all the abdominal segments, except the last have each a lateral spine, longer on those near the tip of the body. The terminal segment has two horny tubercles or short spines at apex.

The larvæ differ somewhat in the proportions of length to breadth, many of them being longer in proportion than the figure.

Cyllodes biplagiatus Lec., fig. 3.—Color of larva white, head darker. Form somewhat maggot-like, nearly cylindrical in life, tapering to both ends; consistence soft. Length 8 mm.

Head small, corneous, narrowed anteriorly, and with a moderately deep, longitudinal, slightly oblique impression behind each antenna, reaching to the base. Antennæ four-jointed, the first joint heavy, stout, second shorter and much narrower, third longer and bearing two small, terminal joints, similarly to what is seen in the larva of *Epipocus;* there are no bristles. Maxillæ with the inner portion broad, very bristly, the outer part with four distinct joints, gradually decreasing in width, and a very small acicular fifth joint. The only spines are a few very minute ones around the tip of the fourth joint. Mandibles serrate on both external and internal edges, the former with about ten teeth, the inner with half that number. A basal piece, just internal to the mandible proper is of firmer consistence, and also toothed along the end, bearing besides a few short bristles. Labial palpi short, two-jointed, the basal joint much larger



COLEOPTERA—Wickham, see page 260.

and longer, the second tapering to tip. Prothorax corneous, though less so than the head, obscurely margined, or with an impressed line interiorly, the apex is narrower than the base, sides arcuate. Meso- and metathorax shorter and broader than the prothorax, not horny in texture. Abdomen of nine segments, the last of which bears on the dorsal surface, near the posterior border, two semi-erect, slightly recurved processes; there is also an additional piece ordinarily retracted into this ninth segment, which seems to be used as a pro-leg. Spiracles in nine pairs, the first situated in the mesothorax, the remainder in segments one to eight of the abdomen; they are all brown in color and somewhat prominent. Legs short; coxæ nearly conical, trochanters subtriangular, femora and tibiæ not differing greatly in length, but the latter is more slender; claw curved, swollen at base; all the joints are more or less bristly, as shown in the figure.

Several were taken at Bayfield, Wis., in June, in large, fleshy fungi. The larvæ enter the ground to transform to pupæ, and the beetle requires several days to attain its full colors. The pupa is of the form shown, and presents no striking characters. The pupal state lasts seven days.

EXPLANATION OF PLATE.

Fig. 1. *Tritoma humeralis* Fab., larva; *a*, antenna; *l*, leg; *md*, mandible; *mt*, mentum; *mx*, maxilla.

Fig. 2. *Carpophilus niger* Say, larva; dissections lettered as before.

Fig. 3. *Cyllodes biplagiatus* Lec., larva; *p*, pupa; dissections as above.

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DESCRIPTIONS OF NEW COCCIDÆ.—II.

By T. D. A. Cockerell, Entomologist N. M. Agr. Exp. Sta.

3. **Bergrothia steelii** Ckll. and Towns., n. sp.—Female very similar to *B. townsendi* Ckll (1893). The yellowish white ovisac gives it the appearance of a small *Pulvinaria*. Antennæ 8-jointed, formula 8 (12) 3 (4567) 8 with three whorls of hairs; 8 decidedly longer than 2, 2 decidedly longer than 3, 6 perhaps a little shorter than 4, 5 or 7. Derm with numerous round gland-spots. Anal ring with six hairs; mentum trimerous. Hind legs with femur slightly longer than tibiæ; tarsus less than half length of tibia. Claw fairly large, curved; trochanter with a long hair; anterior legs less developed than the hindmost ones. Posterior tubercles very inconspicuous, bearing a pair of short, stout spines and a long hair, as in *B. townsendi*. The inner edge of the anogenital ring presents a moniliform appearance. The female after boiling in soda is colorless, with the legs and antennæ yellowish brown.

The following details are added from Prof. Townsend's MS.:

"Adult female suboval, or elongate oval in outline from above; nearly flat below, convex above, of a light reddish brown color, with the legs and antennæ concolorous. Length about 4 mm.; width 2 mm.

"Ovisac elongate, bag-shaped, widened and rounded behind, somewhat narrowed and abrupt before, where the head of the female protrudes; often very largely conformed to the shape of the leaf. Length of felted sac 5–6 mm.; width 2–2.5 mm. It was observed that the whitish sacs were likely to escape notice among the young fruit of the *Larrea*, which was just setting, and was covered with a whitish, woolly pubescence.

"Larva.-- The larva is the same color as the adult female; legs slender, antennæ consisting of only six joints. Larvæ were found May 13th, which were beginning to exude a sac.

"Egg.—The eggs are whitish in color; they are enclosed in the end of the felted sac, behind the body of the female, the head of the female being usually more or less through the anterior end of the sac as the eggs are deposited. Eggs found in the sacs of adult females were unhatched May 13th.

"Food-plant.—Found abundantly May 13th on leaves of the creosote bush (*Larrea mexicana*); occasionally on the stems also. It is usually on the underside of the leaf, which is small and very nearly covered by the felted sac." (Townsend.)

Hab.—Near the Agricultural College, Las Cruces, N. Mex.

This is the insect described by Prof. Townsend in Bull. 7, N. Mex. Agric. Exp. Station, as a new *Signoretia*, no specific name being then proposed. On examination, it turns out to be a *Bergrothia*, very near to *B. townsendi*, but differing principally as follows:

B. townsendi.—Rather smaller, antennæ 7-jointed, 2 and 5 about equal; food-plant *Fouquieria.*

B. steelii.—Rather larger, antennæ 8-jointed, 2 decidedly longer than 3; food-plant *Larrea.*

It is true that one specimen of *B. townsendi* seemed to have 8 joints to the antenna, but 7 was the normal number; and apart from this, the proportions of the joints are not the same in the two forms. Taking this with the very different food-plants, it appears to be necessary to regard *B. steelii* as distinct.

At Prof. Townsend's suggestion, the insect is named after the late Mr. Samuel Steel, who first found it. Mr. Steel was to have been the first graduate of the New Mexico College of Agriculture, in 1893, but was most unfortunately killed in the early part of that year. He had studied entomology with Prof. Townsend, and had shown unusual zeal and ability, so that much was expected of him in the future.

LARVA AND PUPA OF SPHINX LUSCITIOSA, Cram.

By RICHARD E. KUNZE, M. D., New York.

In Fernald's "Sphingidæ of New England" and John B. Smith's "Sphingidæ of America, North of Mexico," no description of this larva is given, and in the language of Prof. Smith "this lack in our knowledge of *Sphinx* larva ought to be soon filled." About a year ago August 19th, I found, on purple willow (*Salix purpurea*), in a swamp in Queens County, N. Y., a full-grown larva of *luscitiosa*, parasitized, as I then thought, and in which opinion Mr. J. Doll joined, who kindly determined it for me. I fed it for nearly four or five days, so as to give me an opportunity of studying it closely and noting difference between it and larva of *S. drupiferarum*, which it resembles in color with the exception of the stripes on each side of the head. I found both these larvæ on the same day, of nearly one size, and very near one another. In a week after pupating, I removed the pupa, which in latter part of May, 1894, produced a perfect ♀ to my surprise.

During the season of 1894, I determined to find *luscitiosa* larvæ come what may, and not knowing the young larva, took every *Sphinx* larva found on willow, and in fact nearly every other larva found on willows of this vicinity. Thus I obtained lots of nice things of which more another time. I hunted these between June 24th and July 22nd in one swamp in Long Island, one bog in West Chester County, N. Y., and another bog in Essex County, N. J., making six trips and finding nine *luscitiosa* larvæ.

Before the second moult this larva cannot be distinguished in color by the naked eye from *Smer. geminatus*, but may easily be separated by noticing the number of sphingial bands. In *luscitiosa* there are *seven* oblique stripes and in the young larva of *geminatus* only *six* visible to the naked eye. In color of the caudal horn, in shape and size of the same, these two larvæ are nearly identical up to the second moult. There are two broods of *luscitiosa* in this vicinity, the second appearing in August.

To find what I did required careful search of every leaf, twig and cane of every species of willow, excepting the weeping-willow. While finding *geminatus* and *Paonias excæcatus* on several kinds of willows, I always took *luscitiosa* from *Salix purpurea*, excepting one or two instances, and the smallest speci-

mens rested on little side shoots of larger branches or canes. When past the third moult, the larva ascends to upper branches of stouter growth, and is then mostly parasitized. Of the nine larvæ found, only three pupated. Two of the number had their caudal horns nipped off close to the base, and both ceased to grow after last moult and perished. In the breeding-cage I did not always give them purple willow so long as I had enough of other species on hand to feed from. Raising from 200 to 250 of various larvæ, all from *Salix*, it required large quantities of food-plants to bring these to pupation, and the difficulty not lessened by the distance from base of supplies.

Description of Larva.

Young larva near first moult.—Cylindrical smooth and color of a light green. There are seven white oblique bands on each side, and two subdorsal thoracic lines. The last oblique band passes into the caudal horn, which is purple and nearly straight. Length of body 12 mm. (about $\frac{15}{32}$ inch), width 1½ mm. Length of caudal horn 2 mm. Thoracic and abdominal feet green, concolorous with body. Under a magnifier the body seems to be covered by many minute whitish points. This specimen was found on *Salix viminalis* or Basket Osier, in Long Island City, July 13, 1894.

Young larva between 2nd and 3rd moult.—Body cylindrical, green, almost color of willow leaf, and entire body finely granulated with white points inclusive of caudal horn. Sphingial bands white, bordered above by a dark green line, darker than color of body. Each one of the bands reaches posteriorly about one-third across adjoining segment. There is one subdorsal, thoracic, yellow line on joints 2, 3 and 4. The caudal horn has laterally a whitish stripe, formed by the seventh oblique band passing into it. Between these whitish stripes are enclosed two crimson lines describing a delta on the dorsum of horn. Below the horn is green. All thoracic or true feet crimson, legs above white. Abdominal feet concolorous with body. Length 24 mm. (about $\frac{15}{16}$ inch), and width of body 3½ mm. This specimen found on *Salix purpurea*, near Mount Vernon, West Chester County, N. Y., July 25, 1894.

Half-grown larva.—Head not quite so triangular as in the larva of *Smerinthus geminatus* and the face oval. On each side of face one vertical green line lighter than the rest and nearly meeting on top of head. Posterior to this line is another of a much darker

green than either the head or body, which, are concolorous. Mouth parts blackish. The seven oblique, white bands are bordered above, pink. Caudal horn granulated, almost straight, yellowish white, laterally and purple at tips. Thoracic legs white, changing to pink below, and feet much more of same color. Abdominal legs green. Spiracles cream colored. Under a magnifier the caudal horn displays short, stout spines. Body slender, cylindrical, smooth, and when magnified is covered by very fine, white dots. There are two white lines on oval plate, forming a delta with apex pointing posteriorly. Length of body at rest, 33 mm. (about 1 $\frac{5}{16}$ inch), when in motion 40 mm. (about 1 $\frac{9}{16}$ inch), width 5 mm. (about $\frac{3}{16}$ inch). Caudal horn 4 mm. long. Before the larva is half-grown very little pink is discernible above the white, sphingial bands. On the first oblique stripe, a little pink appears near the centre of the band, and with each succeeding joint the pink encroaches a little more until it nearly edges the whole length of the last band passing into the caudal horn. About this time, a faint yellow thoracic line is still noticeable on each side of body. This larva was collected near Long Island City, July 13th, feeding on *Salix purpurea*.

Mature larva.—Head oval, of a darker green than body, and with a light green, vertical stripe on each side looking forward. Back of and adjoining it another of a dark green color. Body slender, smooth and of a beautiful emerald-green from dorsum to venter. The seven oblique, white stripes bordered above more of a violet tint instead of the former pink. Caudal horn shining black laterally, and green on dorsal and lower side. Spiracles orange, surrounded by a yellowish ring. Below stigmatal line the lateral surface of body is dotted white, edged by a black ring, which is best seen under a lens. Thoracic feet rose-pink, whitish above. Abdominal feet green. Length of body at rest 55 mm. (2 $\frac{3}{16}$ inch), in motion 65 mm. (2 $\frac{9}{16}$ inch). Width of transverse diameter 9 mm. ($\frac{5}{16}$ inch), and of the dorso-ventral 10 mm. This last measurement is from dorsum to and including feet. Length of caudal horn 5 mm. ($\frac{3}{16}$ inch), and recurved. The oblique or sphingial bands of the mature larva do not now reach into adjoining segment, except the last, passing into caudal horn.

Mature larva one day before pupation.—In shape and color about the same as previously noted. The lateral stripes pure white and the pink border above now changes into violet of more

or less intensity, when viewed under certain lights. The light-green, vertical lines of head become more whitish and meet at the vertex, mandibles and maxillæ green; mouth-part blackish, antennæ cream colored and greenish at base. Stigmata or breathing orifices have changed to light buff color. The edge of clasping surface of pro-legs assume now a brownish shade. True feet same as before. Caudal horn very black on sides and tip. There is now a yellowish white line below the black stripe of horn, into which the seventh oblique white band passes. Length of body at rest 65 mm. Transverse diameter of body 10 mm. (⅜ inch), and of dorso-ventral 12 mm. Horn 6 mm. long. This larva was found in Long Island City, June 24th, on *Salix purpurea*, and went into the ground to transform July 17th, making the time from hatching to pupation four weeks, *i. e.*, judging of its age from size when collected. Larva contracted finally so that length when in motion could not be taken.

Pupa.—Two pupæ were dark brown and one reddish brown, shiny tongue case short, prominent and slightly detached, so as to be scarcely noticeable. Length from 35 mm. (1 $\frac{6}{16}$ inch) to 39 mm. (about 1½ inch). Width across wing-cases, from 8 mm. ($\frac{5}{16}$ inch) to 9 mm. Cremaster 4 mm. long.

Postscript.—On September 2nd, found a larva of *luscitiosa* on white birch (*Betula alba*), in Hudson County, N. Y., about two-thirds grown. It rested on the lower cane of one of the sprouts near the ground. Only one willow within a hundred yards of the spot. Thinking it might have been knocked off the latter, I placed both birch and purple willow in the breeding-cage. It fed on birch at once and, four days later, is still feeding on this new food-plant.

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